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June 06, 2003

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APPLICATION NUMBER: *60/381,722*
FILING DATE: *May 17, 2002*
RELATED PCT APPLICATION NUMBER: *PCT/US03/15120*

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COMMISSIONER OF PATENTS AND TRADEMARKS

M. SIAS
Certifying Officer

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PTO/SB/16 (8-00)
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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

JC973 U.S. PTO 60/381722 05/17/02

INVENTOR(S)

Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Brian L.	Patton	51 Federal City Road Ewing, New Jersey 08638 US

☐ *Additional inventors are being named on the ____ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (280 characters max)

EXPRESSIVE FEATURE MECHANISM FOR ANIMATED CHARACTERS AND DEVICES

CORRESPONDENCE ADDRESS

Direct all correspondence to:

☐ Customer Number [ ] → *Place Customer Number Bar Code Label here*

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☒ Firm *or* Individual Name	Woodbridge & Associates, P.C.				
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Country	US	Telephone	609-924-3773	Fax	609-924-1811

ENCLOSED APPLICATION PARTS *(check all that apply)*

☒ Specification *Number of Pages*	8	☐ CD(s), Number	
☒ Drawing(s) *Number of Sheets*	12	☒ Other (specify)	Acknowledgement Post Card, Recordation of Assignment
☐ Application Data Sheet. See 37 CFR 1.76			

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT *(check one)*

☒ Applicant claims small entity status. See 37 CFR 1.27.

☒ A check or money order is enclosed to cover the filing fees

☒ The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: 23-3040

☐ Payment by credit card. Form PTO-2038 is attached.

FILING FEE AMOUNT ($): $80.00

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☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are: ______________________

Respectfully submitted,

SIGNATURE Richard C Woodbridge

Date 5/17/02

TYPED or PRINTED NAME Richard C. Woodbridge

REGISTRATION NO. *(if appropriate)* 26,423

TELEPHONE 609-924-3773

Docket Number: 5397-102P

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

P19SMALL/REV05

EXPRESS MAIL NUMBER EV044710499US
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"EXPRESS MAIL CERTIFICATE"

"Express Mail" Mailing Label Number: EV044710499US

Express Mail Corporate Account Number: X085783

Date of Deposit: May 17, 2002

Title: **"Expressive Feature Mechanism for Animated Characters and Devices"**

Inventors: Brian L. Patton

Type of Documents:

1. Provisional Application Cover x2 – 1 page
2. $80.00 check to cover filing fee
3. Specification – 8 pages
4. 12 drawings
5. Assignment, Recordation Form and $40.0 check – 3 pages
6. Small Entity Statement – 2 pages
7. This Express Mail Certificate – 1 page
8. Acknowledgement Post Card

I hereby certify that the enclosed documents are being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Commissioner of Patents and Trademarks, Patent and Trademark Office, Box Provisional, Washington, D.C. 20231.

Richard C. Woodbridge, Esq.
(Typed or printed name of person mailing paper or fee)

(Signature of person mailing paper of fee)

Expressive feature mechanism for animated characters and devices

BACKGROUND OF THE INVENTION

This invention pertains to an expressive feature mechanism to be used in animated characters and toys. Previous patents have been issued that describe devices used in animated characters that have mouths, which open, and close to mimic speaking or sucking. Examples of such work would be U.S. Pat No. 4,808,142 by Berliner, which has a motor driven mouth actuator to move the mouth between open and closed positions. U.S. Pat. No. 3,828,469 by Giroud describes a mechanism having two operating rods for moving upper and lower lips. More recently issued patents have been described that allow for a greater control of lip motion. For example, U.S. Pat. No. 6,352,464 by Madland et al. describes a mechanism for an animated character. Madland describes a facial control system comprising of two lip chains embedded behind two lips. The lip chains are attached at either end as well as at a center portion. By positioning the movable center portion relative to the moveable ends various facial expressions can be achieved, however, the described mechanism does not allow for stretching of the lips as it occurs on human and animal faces. Other methods such as the one described in U.S.patent No. 4,177,589 by Villa demonstrate a pneumatic mechanism to open and close the mouth. This does allow for a rounding of the lips but does not allow for a full range of expression such as a frown or broad smile.

Although previous patents have managed to manipulate a mouth movement in varying degrees, none of the prior art suggest a mechanism to stretch a material to form an expression. The current invention is described as a means to make animated characters with complex facial expressions in a minimal component, minimal cost mechanism. With the described invention it is possible to make a full range of motions with a minimum of moving components.

References Cited

U.S. Patent Documents

2,250,916	Jul.,29 1941	Magruder
3,828,469	Aug., 1974	Giroud
3,841,020	Oct., 1974	Ryan
3,881,275	May., 1975	Baulard-Cogan
4,126,960	Nov., 1978	Guerrero
4,139,968	Feb., 1979	Milner
4,775,352	Oct., 1978	Curran
4,177,589	Dec., 1979	Villa
4,805,328	Feb., 1989	Mirahem
4,808,142	Feb., 1989	Berliner
4,850,930	Jul., 1989	Sato
4,869,703	Sept., 1989	Ong
4,900,289	Feb., 1990	May
4,932,428	May., 1990	Curran
5,074,821	Dec., 1991	McKeefery
5,407,376	Apr., 1995	Avital
5,413,516	May., 1995	Lam
5,823,847	Oct., 1998	Gellman
6,238,262	May., 2001	Pracas
6,352,464	Mar., 2002	Madland

SUMMARY OF INVENTION

The present invention provides an expressive feature mechanism for animated characters or devices. The mechanism is composed principally of a pair of wheels or meshed gears. On each wheel or gear there is an attachment point and a device for inflecting or deflecting an elastomeric or flexible material or device. The primary goal of the wheels or gears is to stretch or allow for contraction of the elastomeric or flexible material or device attached to a point along a radius. With the elastomeric or flexible material or device attached to more than one wheel or gear it allows for an increase in the range of motion of the elastomeric or flexible material or device. Meshing of the gears allows for a reduction of drive sources while maintaining bilateral symmetry of motion. Independent wheels allow for asymmetric motion. The inflection/deflection devices offer an increase in the recognition of an exaggerated expression produced by the bending of the elastomeric or flexible material or device. A more rudimentary expressive system can be produced without the bending of the elastomeric or flexible material or device between its attachment points. The elastomeric or flexible material or device is envisioned to be in a variety of conformations, ranging from a continuous band to a molded mask hiding yet attached to the entire mechanism. It is envisioned that the transmission of movement from the gears to the elastomeric or flexible material or device may also occur via indirect coupling such as magnetism.

This invention advantageously provides a moving lip mechanism for animated characters or devices, which is simple in its design and construction. The device is capable of producing a range of motions in a range of speeds able to simulate a variety of expressions and mouth movements. With the synchronization of sound the device can simulate smooth, realistic vocalization.

BRIEF DESCRIPTION OF DRAWINGS

This invention will be described further with reference to the following drawings, in which:

FIG. 1a A schematic isometric view showing a pair of dual gear single drive mechanisms using motors with non-integrated encoding with the elastomeric material in place around attachment points on each of the gears.

FIG. 1b A support frame removed schematic isometric view showing a pair of dual gear single drive mechanisms using motors with non-integrated encoding with the elastomeric material in place around attachment points on each of the gears.

FIG. 1c A schematic isometric view showing a single dual gear single drive mechanism using a motor with non-integrated encoding.

FIG. 1d A schematic right side view showing a pair of dual gear single drive mechanisms using motors with non-integrated encoding with the elastomeric material in place around attachment points on each of the gears.

FIG. 1e A schematic front view showing a pair of dual gear single drive mechanisms using motors with non-integrated encoding with the elastomeric material in place around attachment points on each of the gears.

FIG. 1f A schematic top view showing a pair of dual gear single drive mechanisms using motors with non-integrated encoding with the elastomeric material in place around attachment points on each of the gears.

FIG. 2 A schematic isometric view of an expression gear with an unused portion of its teeth removed

FIG. 3a – FIG. 3l A schematic top view showing the gear arrangement and relative position of the attachment points and inflection/deflection points to present the elastomeric material in an expression.

FIG. 4a is a schematic Isometric view showing a pair of dual gear, single drive mechanisms with the elastomeric material in place around attachment points on each of the gears.

FIG. 4b is a schematic top view showing a pair of dual gear, single drive mechanisms with the elastomeric material in place around attachment points on each of the gears.

FIG. 4c is a schematic side view showing a pair of dual gear, single drive mechanisms with the elastomeric material in place around attachment points on each of the gears.

FIG. 5a is a schematic isometric view showing a single drive four gear, rack and pinion mechanisms with the elastomeric material in place around attachment points on each of the gears.

FIG. 5b is a schematic top view showing a single drive, four gear, rack and pinion mechanisms with the elastomeric material in place around attachment points on each of the gears.

FIG. 5c is a schematic side view showing a single drive, four gear, rack and pinion mechanisms with the elastomeric material in place around attachment points on each of the gears.

FIG. 6a is a schematic isometric view showing a pair of dual gear, single drive mechanisms with an angular offset and the elastomeric material in place around attachment points on each of the gears.

FIG. 6b is a schematic isometric view showing a pair of dual gear single drive mechanisms with an angular offset.

FIG. 6c is a schematic front view showing a single dual gear, single drive mechanism with an angular offset.

FIG. 6d is a schematic top view showing a pair of dual gear, single drive mechanisms with an angular offset and the elastomeric material in place around attachment points on each of the gears.

FIG. 6e is a schematic side view showing a pair of dual gear single drive mechanisms with an angular offset.

FIG. 7 is a schematic isometric view showing a pair of dual gear, single drive mechanisms with the elastomeric material being represented as a flexible mask in place around attachment points on each of the gears.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device and method, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring to FIGS. 1a-1f the mechanism 10 further comprises of a lower motor support frame 19 an upper motor support frame 18, a gear support frame 17 and a cover plate 16. The motor support frames secure two motors 20 and 22, which in turn have small motor drive gears 24 and 26 respectively attached to their perspective drive shafts. Gears 24 and 26 mesh with reduction gears 28 and 30 respectively. Reduced diameters of reduction gears 28 and 30 mesh with primary expression gears 32 and 34 respectively. Positional sensing of the primary expression gear 32 is achieved by light transmission and reception through a coded series of encoding holes 36 by optical switch 40. In this preferred embodiment 10 holes are arranged in a unique array to allow for discreet sensing of position. It is understood that other commercial means of encoding of position would be equally effective in positional sensing. Magnetic encoding, variable resistance, transmission slots counting, and reflective encoding are examples of other common in the field methods of rotational encoding. Primary expression gears 32 and 34 in turn mesh with secondary expression gears 44 and 46 respectively. Positional sensing of the primary expression gear 46 is achieved by light transmission and reception through a coded series of holes by transmission reception unit 42. Primary expression gears 32 and 34 have pin support arms 48 and 52 affixed to them respectively. Secondary expression gears 44 and 46 have pin support arms 50 and 54 affixed to them respectively. Each pin support arm has one attachment pin and one inflection-deflection pin affixed to a point in relation to the radius of each support arms respective expression gears at a fixed degree apart from one another. In the case of support arm 48, it has attachment pin 60 and inflection-deflection pin 66 affixed. In the case of support arm 50, it has attachment pin 62 and inflection-deflection pin 64 affixed. In the case of support arm 52, it has attachment pin 56 and inflection-deflection pin 68 affixed. In the case of support arm 54, it has attachment pin 58 and inflection-deflection pin 70 affixed. Fitted around the four attachment points are elastomeric material 70. To prevent the return rotation of the primary and secondary expression gears gearlocks 82 and 84 fits into the teeth of secondary expression gears 44 and 46 respectively. Gearlock 82 is allowed to release secondary expression gear 44 by being pulled by solenoid 90 and pivoted on axis 86. Gearlock 84 is allowed to release secondary expression gear 44 by being pulled by solenoid 92 and pivoted on axis 88.

FIG. 1a of the preferred embodiment illustrates an isometric view of the preferred embodiment of the mechanism 10 In this view, the attachment points 56,58,60,and 62 or holding the elastomeric material 80, representing lips, in a smiling expression. In the Preferred embodiment, power to the motors 20 and 22 (see also FIG1b) is not applied once the position is sensed by transmission reception unit 40 over the proper coded holes 36. Instead, position is maintained against the pull of elastomeric material 80 by securing against rotation with the gearlocks 82 and 84 (see also FIG. 1b). Rotation of the motors and thus change in expression of 10 as represented by the position of 80 is allowed by the activation of solenoids 90 and 92 (see also FIG. 1b) and the pull back of respective gearlocks 82 and 84.

FIG. 1b of the preferred embodiment shows the same isometric view as FIG. 1a but with the removal of support frames 16,17,18,and 19 (see also FIG1a) for clarity. In this view the holes allowing for positional sensing are visible

in the primary expression gear 32 and the secondary expression gear 46. Optical switches 40 and 42 can be seen resting in position above encoding holes 36 and 38 respectively.

FIG. 1c of the preferred embodiment shows isometric view of one drive and the associated gears of the mechanism 10. This view give clear perspective of the intermediate position and meshing of the reduction gear 28 to the small motor drive gear 24 and primary expression gear 32.

FIG. 1d and FIG. 1e of the preferred embodiment show a right side and front view of the mechanism 10. These views give clear perspectives of the relative positions of reduction gears 28 and 30 to their meshed small motor drive gears 24 and 26 and primary expression gears 32 and 34.

FIG.1f of the preferred embodiment shows a top view of the mechanism 10. This view would be the side that faces forward and represents the mouth of an animated character or design.

FIG. 2 demonstrates alternate embodiment of either the primary or secondary expression gear assemblies. In this figure, the gear 94 has been reduced in size to minimize overall construction size. Since only about 180 degrees of rotation is needed to reproduce most recognizable facial expressions, the non-meshed portions of the gear have been cut off. The support arm 94 would be manufactured into a position that fits its need as a primary expression gear or secondary expression gear.

FIGS. 3a-3l demonstrate examples of expression gear arrangements and their effect on the elastomeric material stretched around the attachment points. FIG. 3a, FIG. 3b and FIG. 3c show arrangements approximating a smile. FIG. 3d to FIG. 3g show expressions ranging from surprise to talking intermediates. FIG. 3h - FIG. 3k shows arrangements emulating sadness and anger. FIG. 3l shows the mechanism at rest.

FIGS. 4a-4c shows an alternate embodiment 11 to the mechanism represented as 10 in FIGS. 1a-1e. In this embodiment, servo motors 100 and 102 replace the small motors as a means to drive the primary expression gears 104 and 106 respectively. This method eliminates the need for a gearlock mechanism since position is maintained for as long as power is applied or until the servo receives instructions to reposition itself. The primary expression gears 104 and 106 mesh with secondary expression gears respectively. In this embodiment 11, the attachment points 112, 114, 116, and 118 are affixed directly to the expression gears 104, 106, 108 and 110. This configuration eliminates the need for support arms 48, 50, 52, and 54 (see FIG 1b).

Referring to isometric FIG. 4a and top view FIG. 4b of a pair of dual gear single drive mechanisms, an elastomeric material 128 is placed in position in contact with attachment points 112, 114, 116,and 118. Gears 104 and 106 are attached to servo drives 100 and 102 respectively with integrated gear reduction and positional sensors. As motor drives 102 and 104 rotate, driving their attached gears 104 and 106 respectively, their meshed gears 108 and 112 in turn rotates in the opposite direction. The rotation of the meshed gears results in the radial displacement of the attachment points 112, 114, 116, and 118. As the gears 104, 106, 108, and 110 rotate, the elastomeric material in contact with the attachment points 112, 114, 116, and 118 gets pulled or is allowed to contract as the attachment points travel in a path defined by their placement on the gears radius. In the event that the rotation of the gears 104, 106, 108, and 110 causes the inflection/deflection points 120, 122, 124, and 126 to travel beyond a point defined by a line drawn between the two attachment points 112, 114, 116, and 118, the elastomeric material will be stretched to accommodate the radial movement of the inflection/deflection points 120, 122, 124, and 126.

FIG. 4c shows a schematic side view of a pair of dual gear single drive mechanisms. Clarity is added to figures 4a and 4b by showing the relative positions of the drives 100 and 102, the gears 104, 106, 108, and 110, the attachment points 116 and 118, the inflection/deflection points 122 and 126, and the elastomeric material 128.

Referring to isometric FIG. 5a and top view FIG. 5b of a single drive four gear rack and pinion mechanisms 12, an elastomeric material 150 is placed in position in contact with attachment points 160, 162, 164 and 166. Pinion expression gears 152 and 155 are meshed with racks 144 and 146 that can be moved by the action of levers 136 and 138 respectively. Levers 136 and 138 are rotated on their fulcrums 140 and 142 respectively by the force applied by Pin 134 as the result of the rotation of wheel 132. As wheel 132 attached motor drive 130 rotates, the displacement of levers 136 and 138 causes the movement of a racks 144 and 146 to rotate its matched pinion expression gears 152

and 154. The secondary expression gears 156 and 158 rotate in the opposite direction of their meshed primary expression gears 152 and 154 respectively. The rotation of the meshed expression gears 152, 154, 156 and 158 result in the radial displacement of the attachment points 112, 114, 116, and 118. As the gears rotate, the elastomeric material 150 in contact with the attachment points 112, 114, 116, and 118 gets pulled or is allowed to contract as the attachment points travel in a path defined by their placement on the gears radius.

FIG. 5c shows a schematic side view of a single drive four gear rack and pinion mechanism 12. Clarity is added to FIG. 5a and FIG. 5b by showing the relative positions of the drive 130, the wheel 132, levers 136 and 138, racks 144 and 146, the pinion expression gear 154, the attachment points 112, 114, 116, and 118, the inflection/deflection points 120, 122, 124, and 126, and the elastomeric material 176.

FIGS. 6a, 6b, 6c and 6d shows an alternate embodiment 13 to the mechanism represented as 10 in FIGS. 1a-1e. In this embodiment, servo motors 180 and 182 replace the small motors as a means to drive the primary expression gears 184 and 186 respectively. This method eliminates the need for a gearlock mechanism since position is maintained for as long as power is applied or until the servo receives instructions to reposition itself. The primary expression gears 184 and 186 mesh with secondary expression gears 188 and 190 respectively. In this embodiment 13, the expression gears 184, 186, 188 and 190 have their gear teeth set at an angle to allow the gears to rotate on separate planes. By setting the gears at an angle it is possible to better fit the model of a human or animal face if desired. Attachment points 200, 202, 204 and 206 are affixed to support arms 194, 198, 196 and 192 respectively. Inflection/deflection points 212, 214, 208 and 210 are affixed to support arms 194,198, 196 and 192 respectively. The support arms 192 and 194 are affixed to primary expression gears 184 and 186 respectively. The support arms 196 and 198 are affixed to secondary expression gears 188 and190 respectively. An elastomeric material 216 is placed in position in contact with attachment points 200, 202, 204 and 206.

Referring to isometric FIG. 6a of a pair of dual gear single drive mechanisms, an elastomeric material 216 is placed in position in contact with Attachment points 200, 202, 204 and 206. Primary expression gears 184 and 186 are attached to servo drives 180 and 182 respectively with integrated gear reduction and positional sensors. As motor drives 180 and 182 rotate, driving their attached primary expression gears 184 and 186 respectively, their meshed secondary expression gears 188 and 190 in turn rotate in the opposite direction. The rotation of the expression gears 184, 186, 188 and 190 results in the radial displacement of the attachment points 200, 202, 204 and 206. An elastomeric material 216 is placed in position in contact with attachment points 200, 202, 204 and 206. As the expression gears 184, 186, 188 and 190 rotate, the elastomeric material 216 in contact with the attachment points 200, 202, 204 and 206 gets pulled or is allowed to contract as the attachment points 200, 202, 204 and 206 travel in a path defined by their placement on the expression gears radius. In the event that the rotation of the attachment points 200, 202, 204 and 206 causes the inflection/deflection points 212, 214, 208 and 210 to travel beyond a point defined by a line drawn between two attachment points 200, 202, 204 and 206, the elastomeric material will be stretched to accommodate the radial movement of the inflection/deflection points 212, 214, 208 and 210.

FIG.6b Isometric view of 13 showing the elastomeric material 216 removed for clarity. Primary expression gear 186 and meshed secondary expression gear 190 are shown rotated so that support arms 194 and 198 present attachment points 200 and 202 in a position that would reflect a smile similar to the one demonstrated in FIG.3a. The inflection/deflection points 212 and 214 would then contact the elastomeric material to further stretch the material in the form of a smile.

FIG.6c Side view of one servo drive 182 and one meshed pair of expression gears 186 and 190. Removal of one drive and a meshed gear pair adds clarity to the view of how angular displacement of the expression gears 186 and 190 is achieved. Relative position of support arms 194 and 198 as well as attachment points 200 and 202 and inflection/deflection points 212 and 214 is visible.

FIG.6d and FIG. 6e Top and side view respectively of 13 showing the elastomeric material 216 removed for clarity. Primary expression gear 186 and meshed secondary expression gear 190 are shown rotated so that support arms 194 and 198 present attachment points 200 and 202 in a position that would reflect a smile similar to the one demonstrated in FIG.3a. The inflection/deflection points 212 and 214 would then contact the elastomeric material to further stretch the material in the form of a smile.

FIG. 7 Completed unit **14** demonstrates placement of an elasomeric mask **220** around a pair of dual gear single drive mechanism **11** as represented in FIG. 4a. In this figure the inflection/deflection points engage ridges or grooves embedded into the material of the masks construction.

Abstract

A mechanism for animated characters capable of visually communicating facial expressions is provided. The mechanism has two meshed gears per upper or lower lip. One gear of each pair is rotated by a single drive. Each gear has two guidance devices. Rotation of any gear to which the elastomeric material is connected via a guidance device results in the stretch or ability to retract the elastomeric material. Secondary guidance devices on a gear, when in contact with the elastomeric material, cause an inflection or deflection of the elastomeric material. Resulting stretch or bending of the elastomeric material mimics facial expressions.

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) AND 1.27 (c)) - SMALL BUSINESS CONCERN	Docket No. 5397-102P

Serial No.	Filing Date	Patent No.	Issue Date
HEREWITH	HEREWITH	HEREWITH	HEREWITH

Applicant/ Patentee: **Brian L. Patton**

Invention: **EXPRESSIVE FEATURE MECHANISM FOR ANIMATED CHARACTERS AND DEVICES**

I hereby declare that I am:

- ☒ the owner of the small business concern identified below:
- ☐ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN: **Thin Air Creations, LLC**
ADDRESS OF CONCERN: **51 Federal City Road, Ewing, New Jersey 08638**

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the above identified invention described in:

- ☒ the specification filed herewith with title as listed above.
- ☐ the application identified above.
- ☐ the patent identified above.

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed on the next page and no rights to the invention are held by any person, other than the inventor, who could not qualify as an independent inventor under 37 CFR 1.9(c) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

☒ no such person, concern or organization exists.
☐ each such person, concern or organization is listed below.

FULL NAME ______________________
ADDRESS ______________________
☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME ______________________
ADDRESS ______________________
☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME ______________________
ADDRESS ______________________
☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

FULL NAME ______________________
ADDRESS ______________________
☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING: **Brian L. Patton**

TITLE OF PERSON SIGNING OTHER THAN OWNER: ______________________

ADDRESS OF PERSON SIGNING: **51 Federal City Road, Ewing, New Jersey 08638**

SIGNATURE: Brian Patton DATE: 5/16/2002

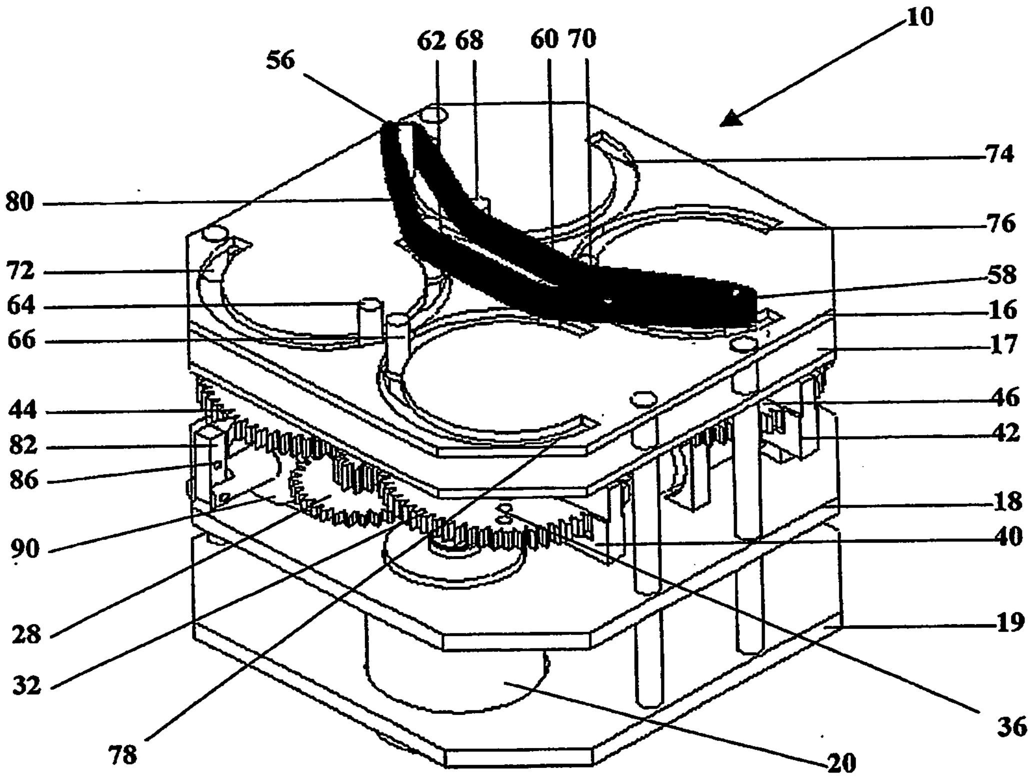
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FIG. 1a

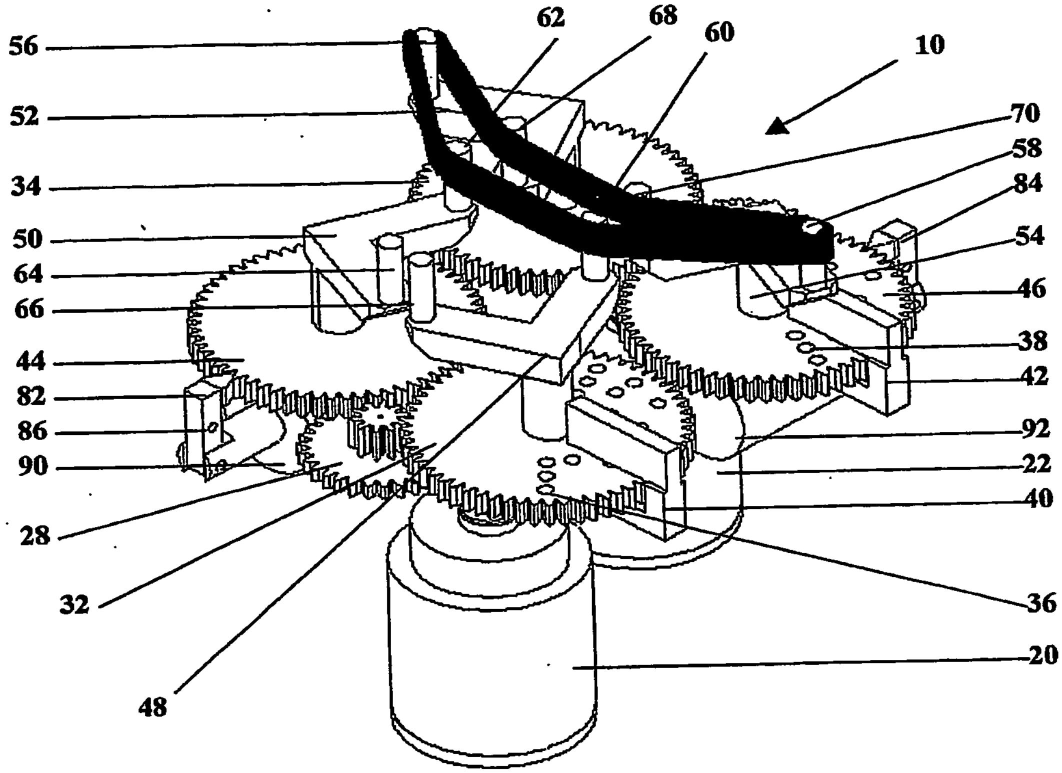
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FIG. 1b

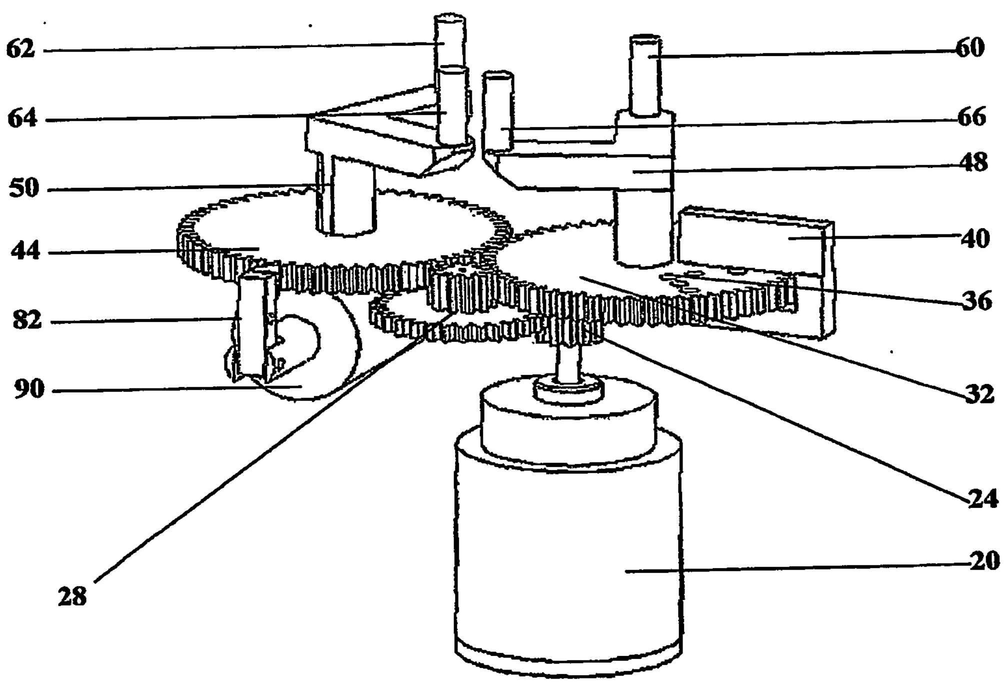
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FIG. 1c

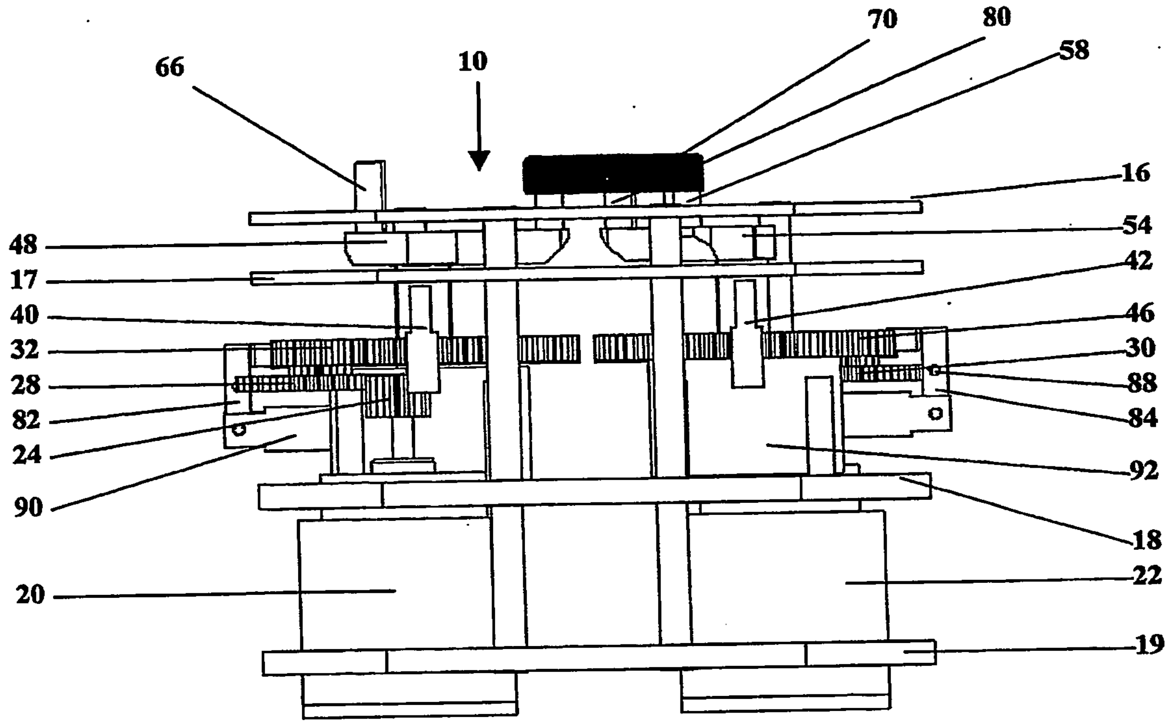

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FIG. 1d

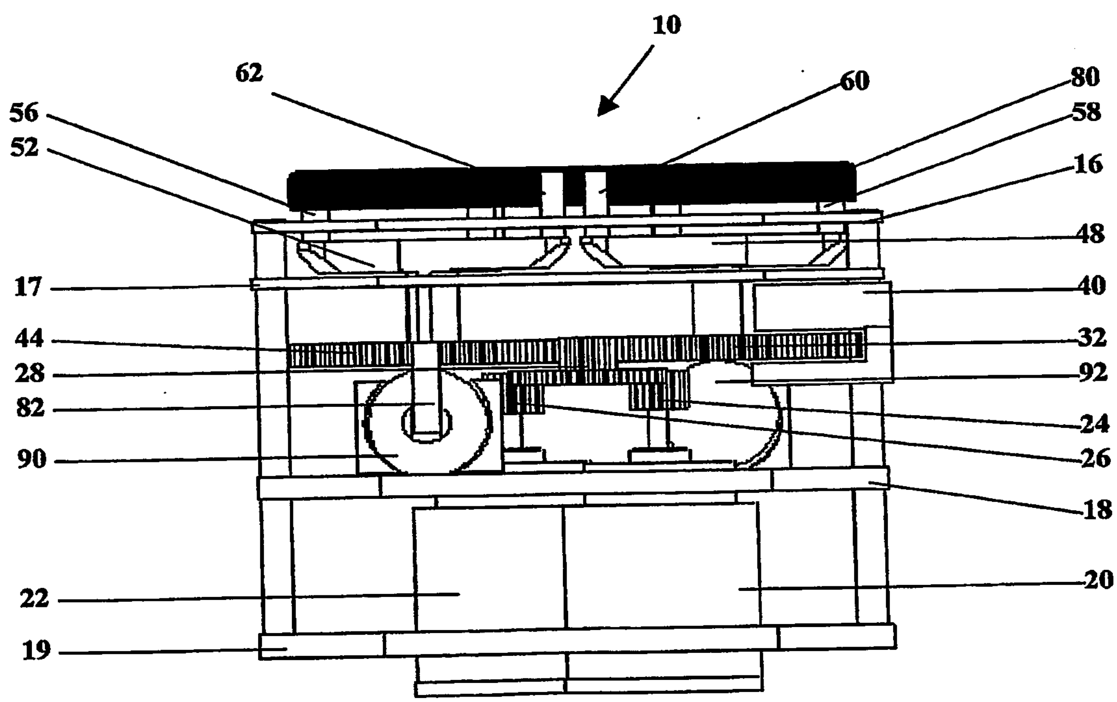

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FIG. 1e

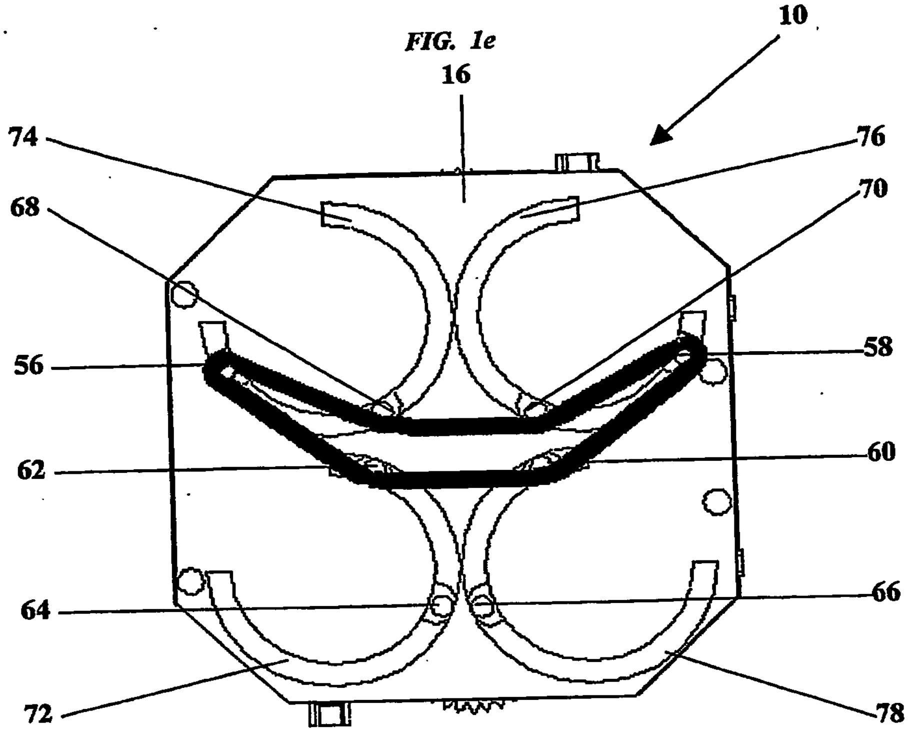


FIG. 1f

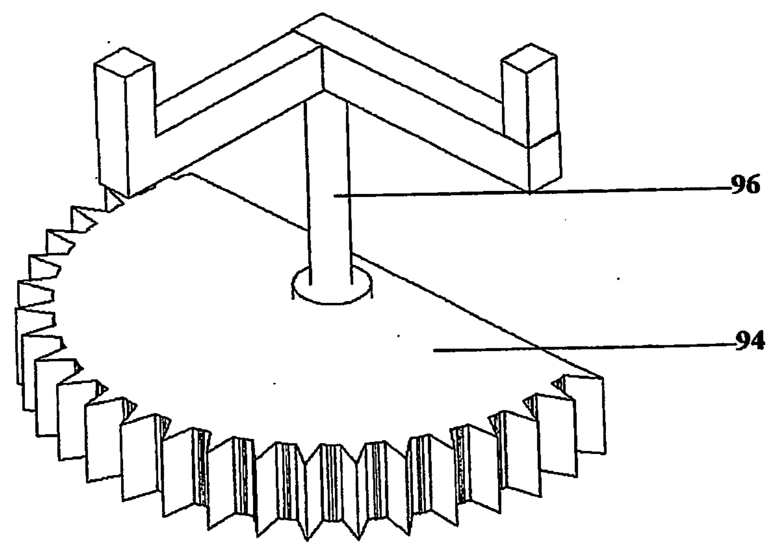


FIG. 2

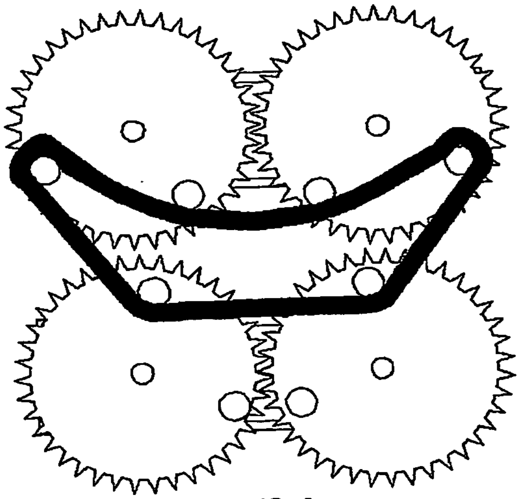


FIG. 3a

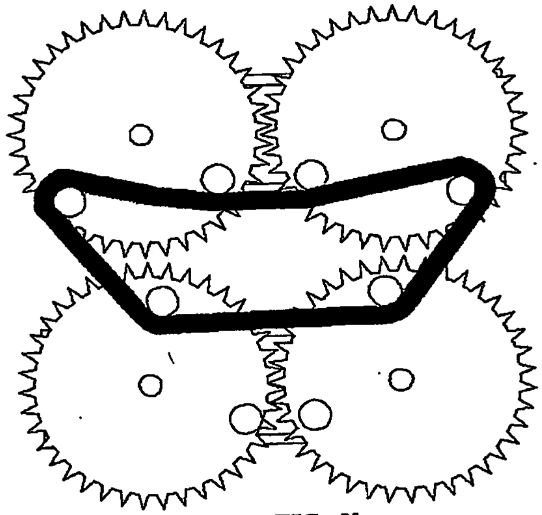


FIG. 3b

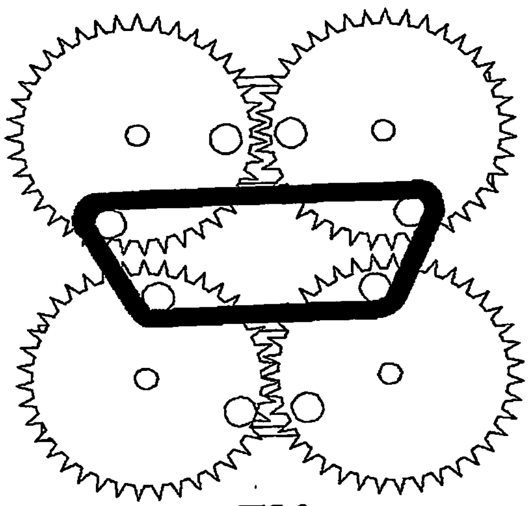


FIG. 3c

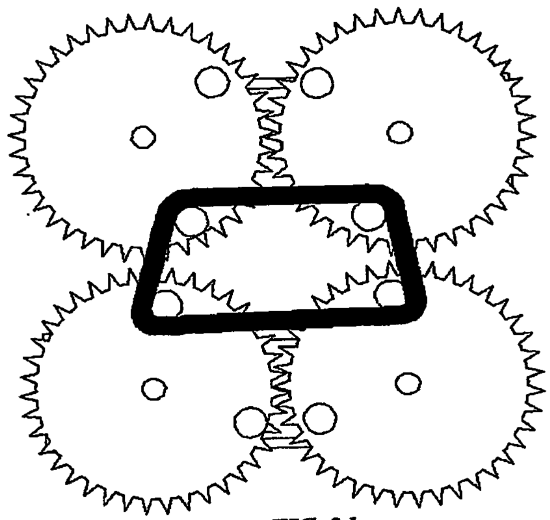
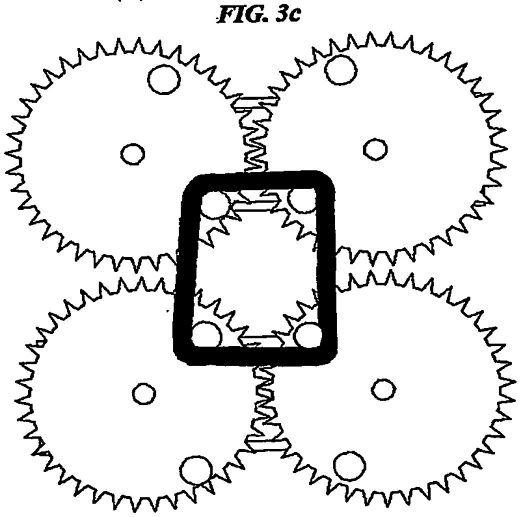


FIG. 3d



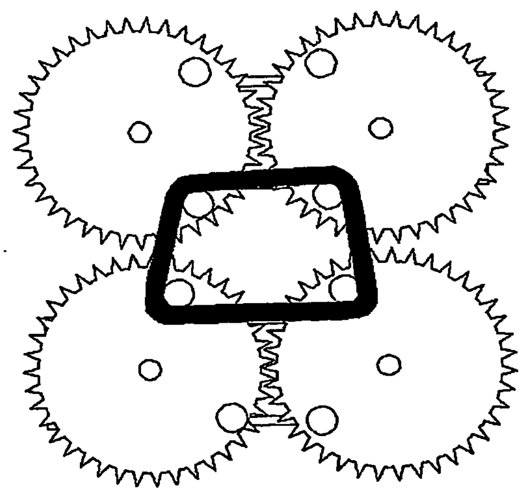
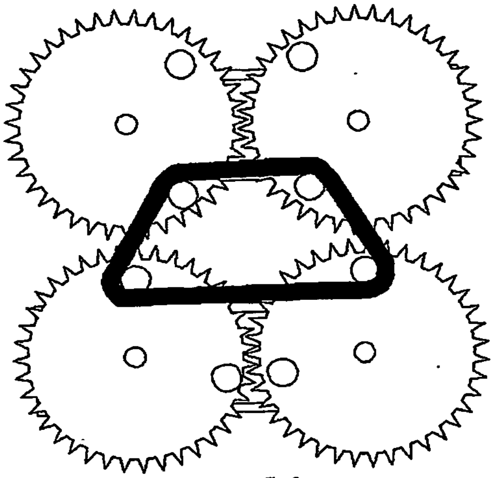


FIG. 3e

FIG. 3f



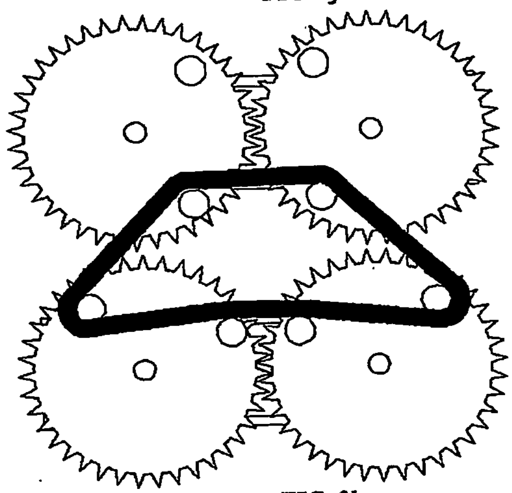
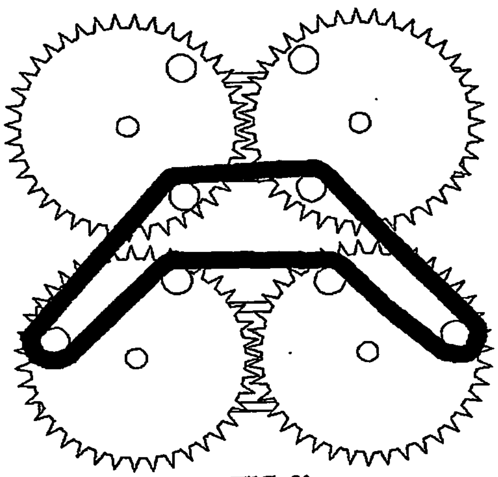


FIG. 3g

FIG. 3h



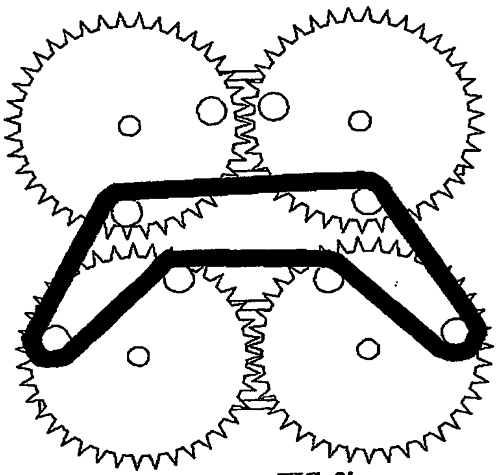
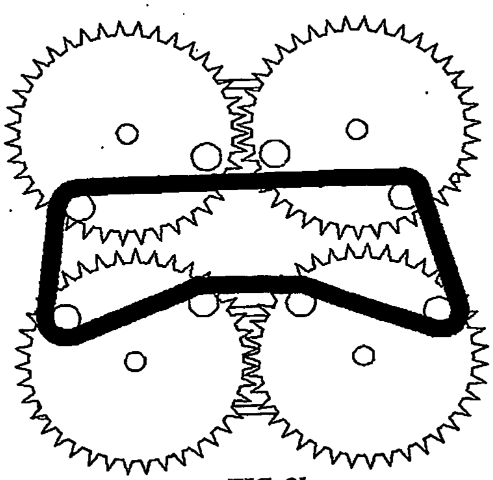


FIG. 3i

FIG. 3j



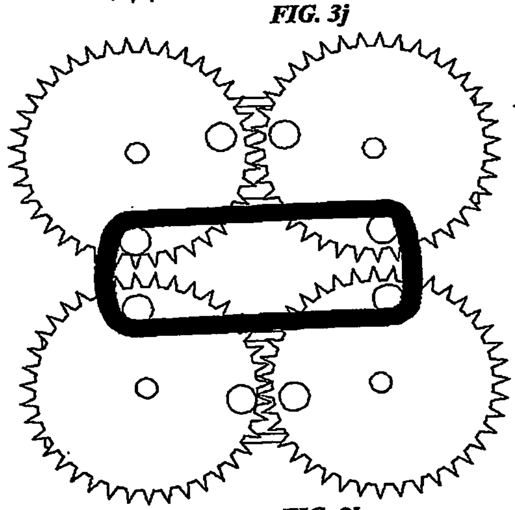


FIG. 3k

FIG. 3l

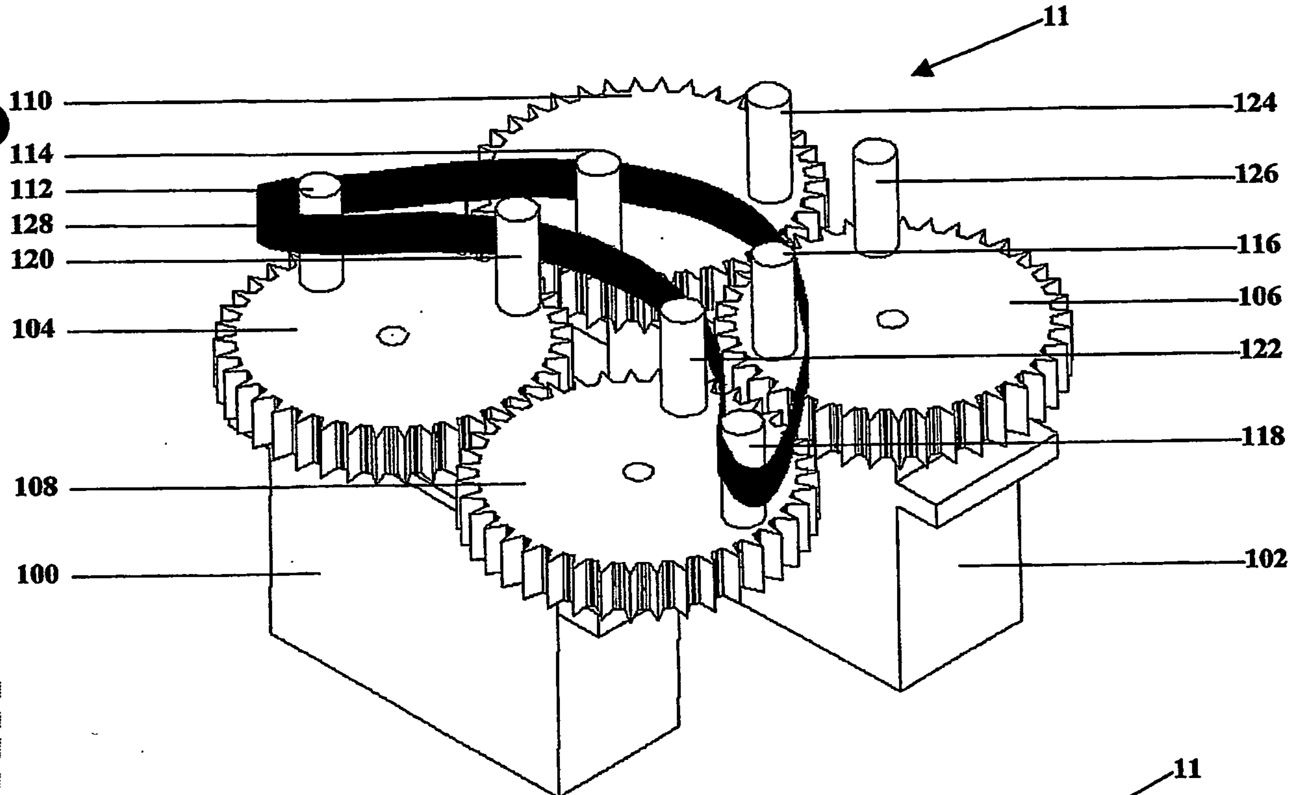

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FIG. 4a

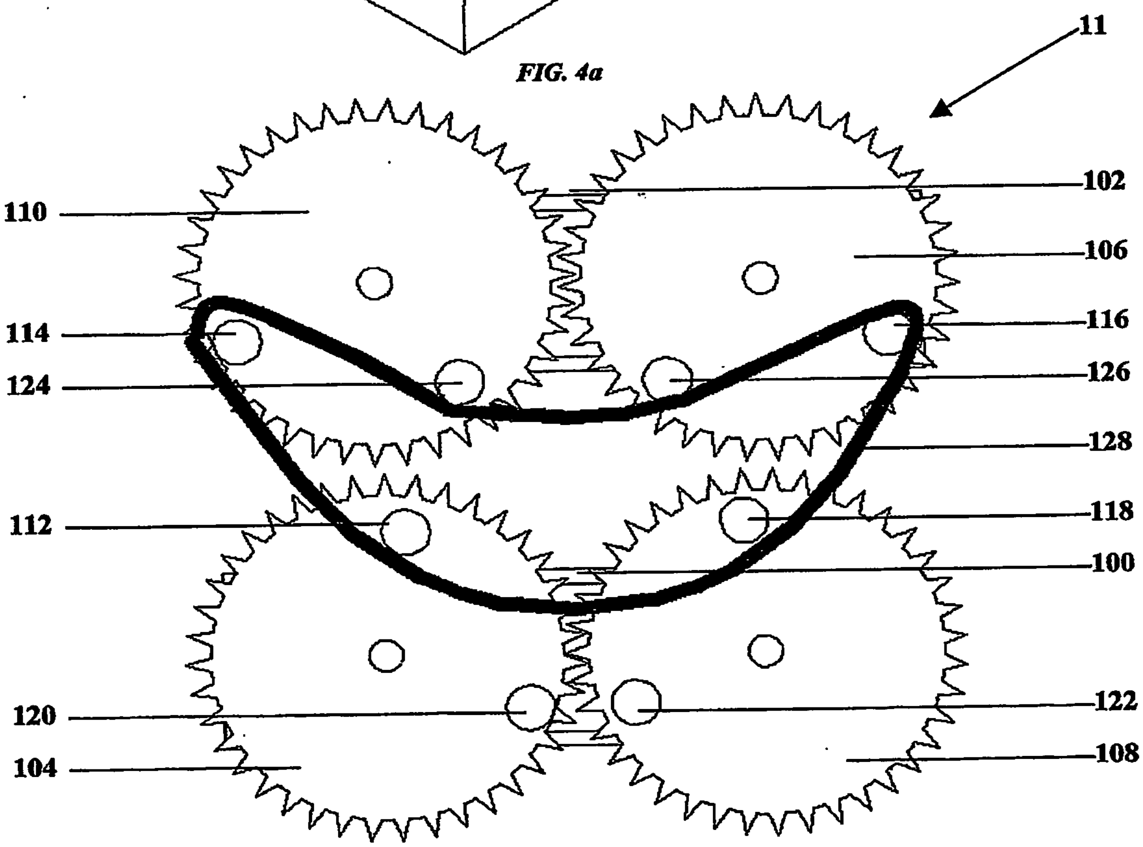
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FIG. 4b

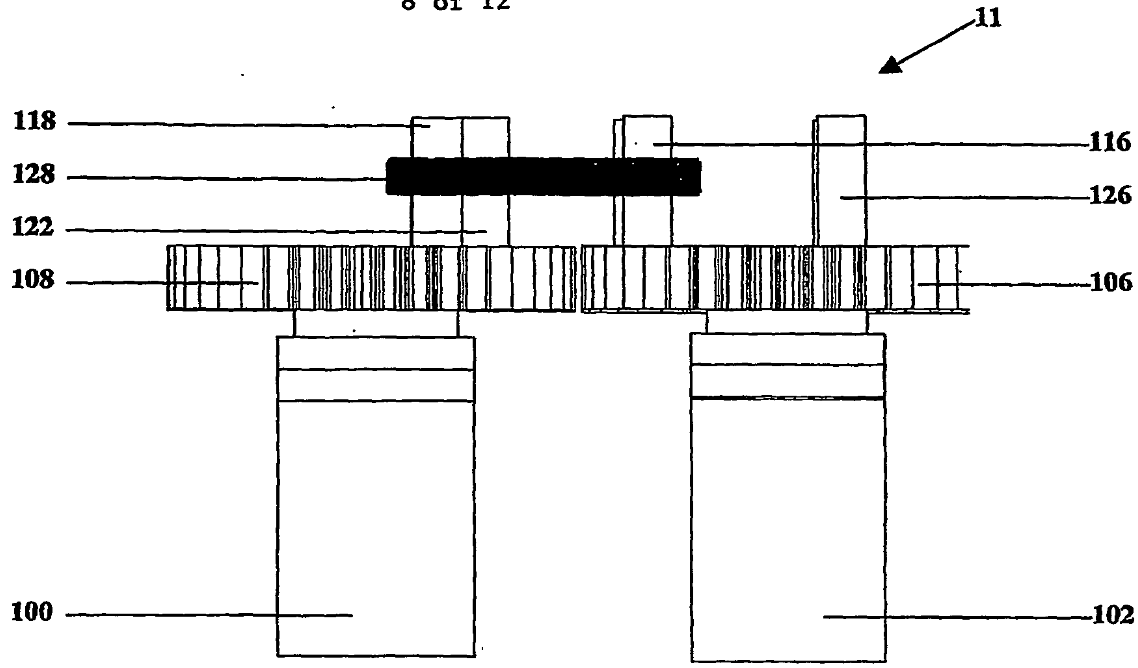
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FIG. 4c

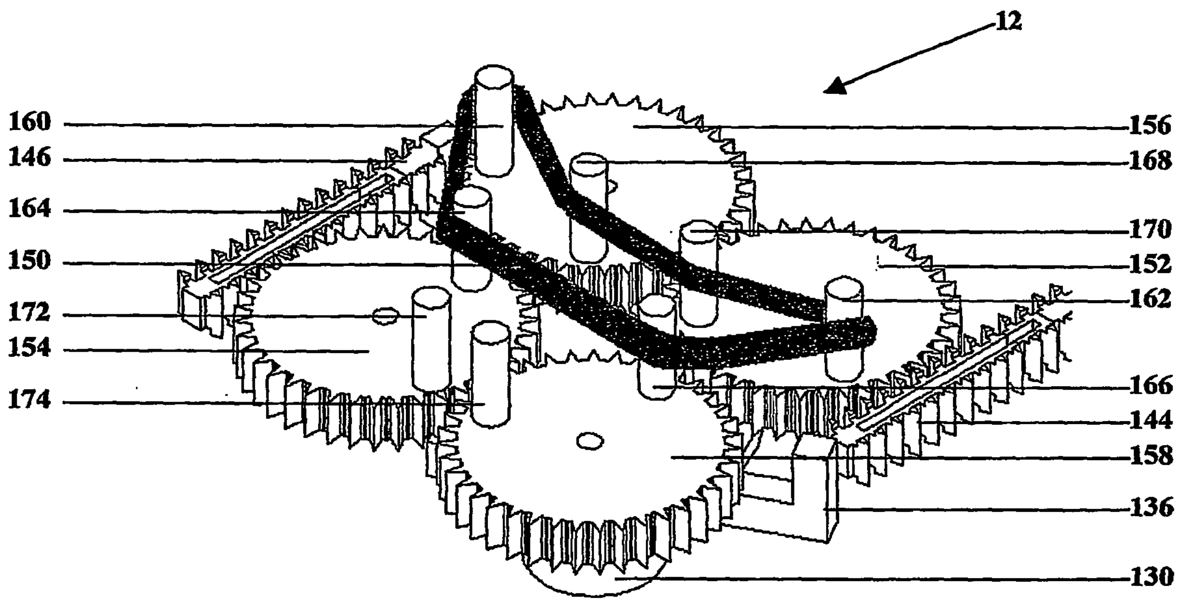
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FIG. 5a

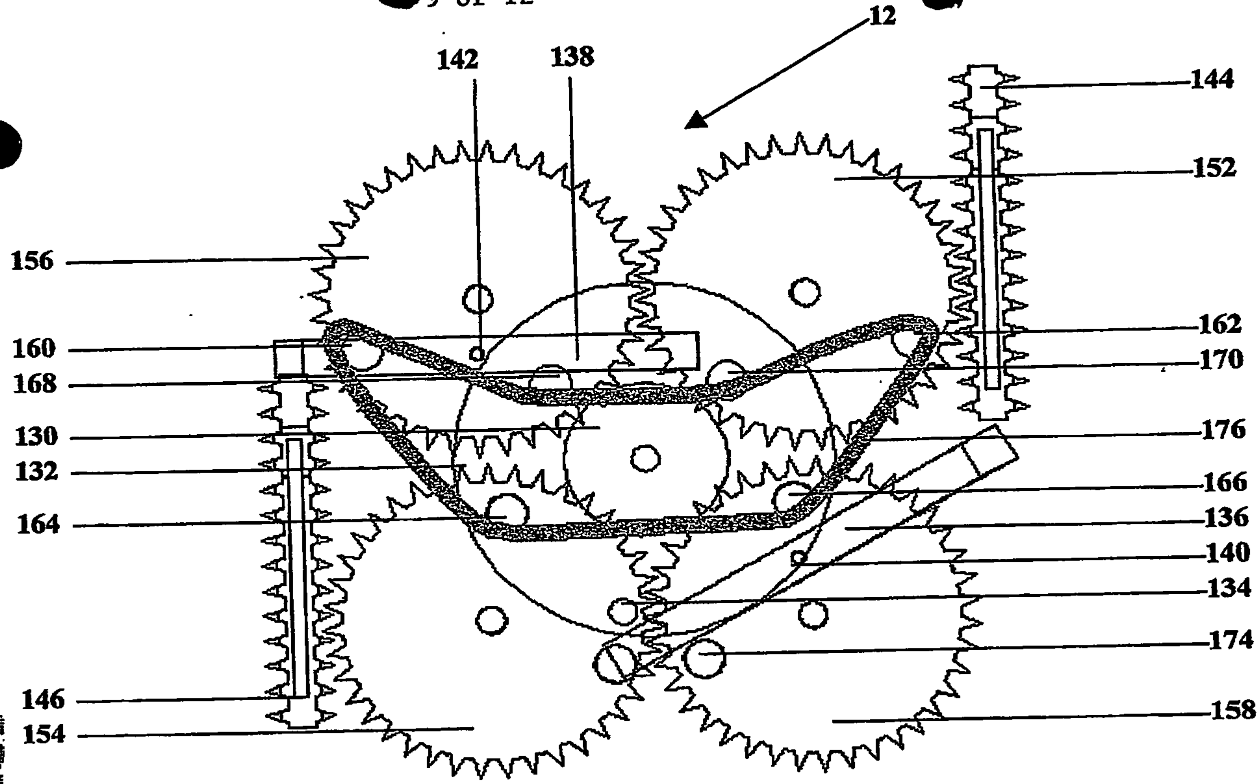
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FIG. 5b

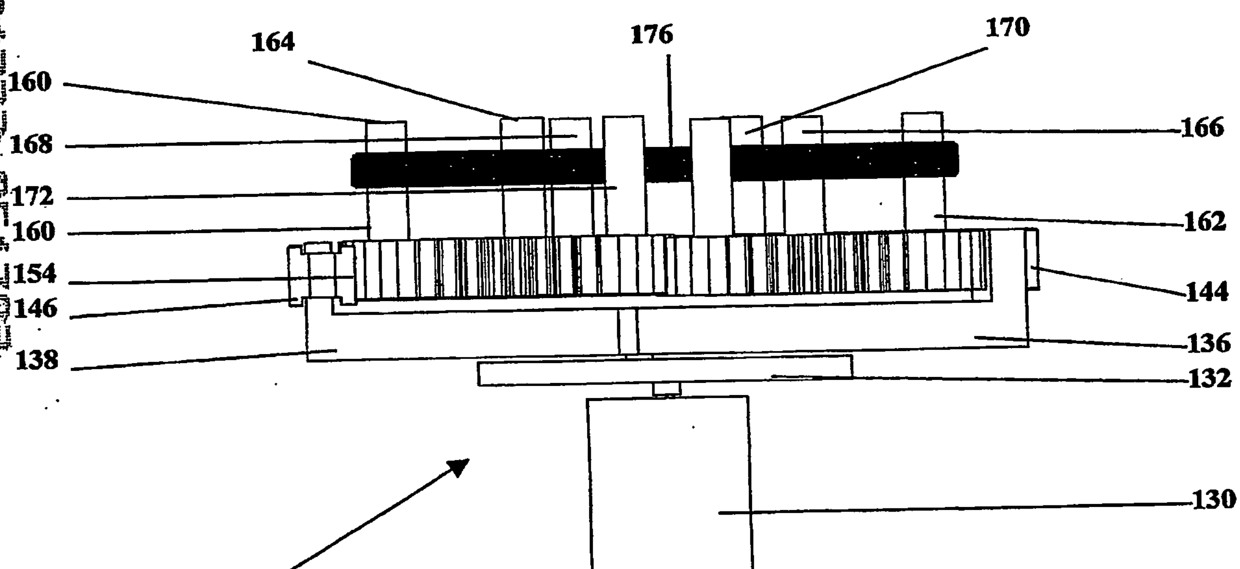
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FIG. 5c

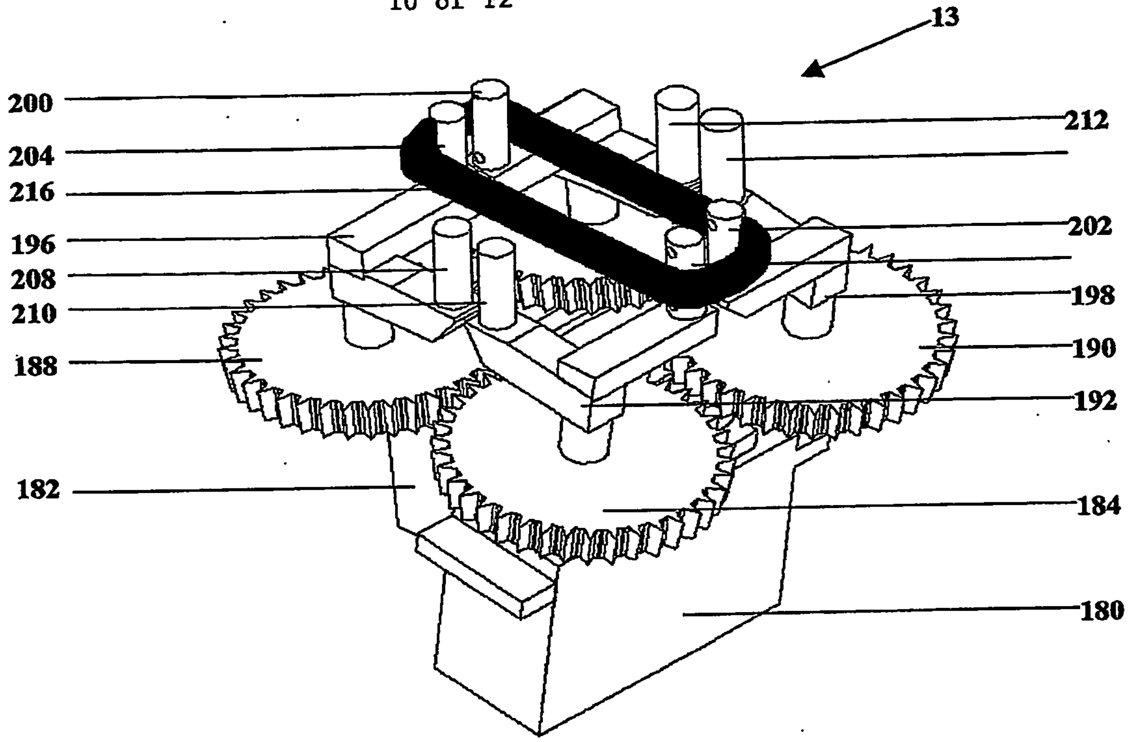
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FIG. 6a

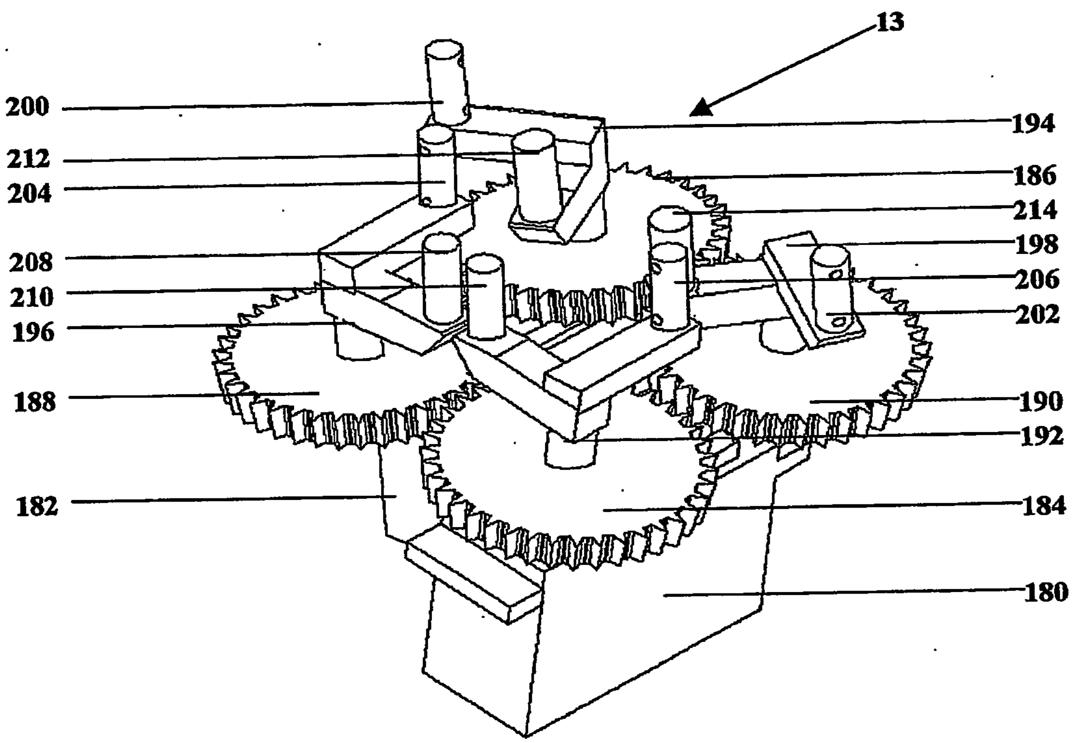
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FIG. 6b

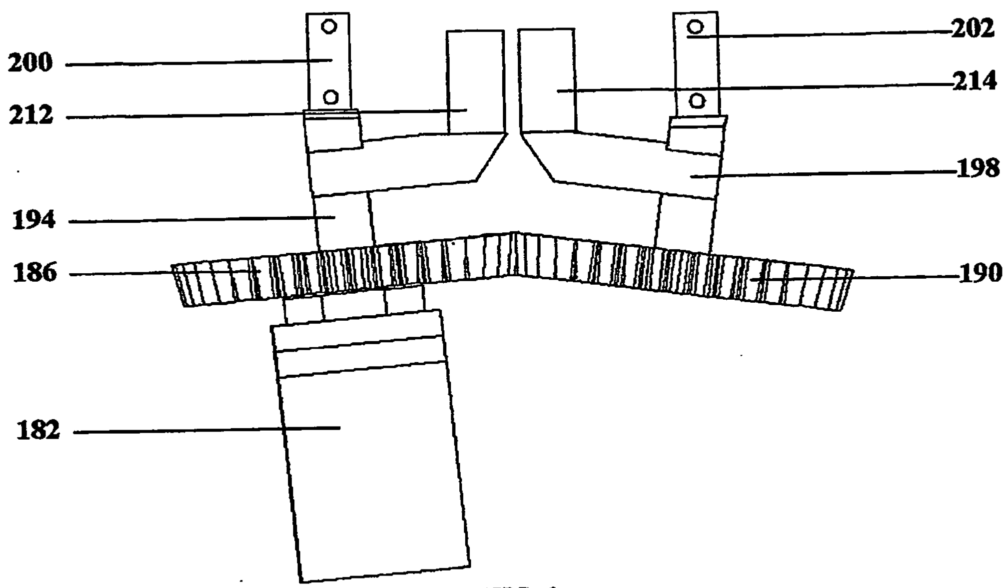

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FIG. 6c

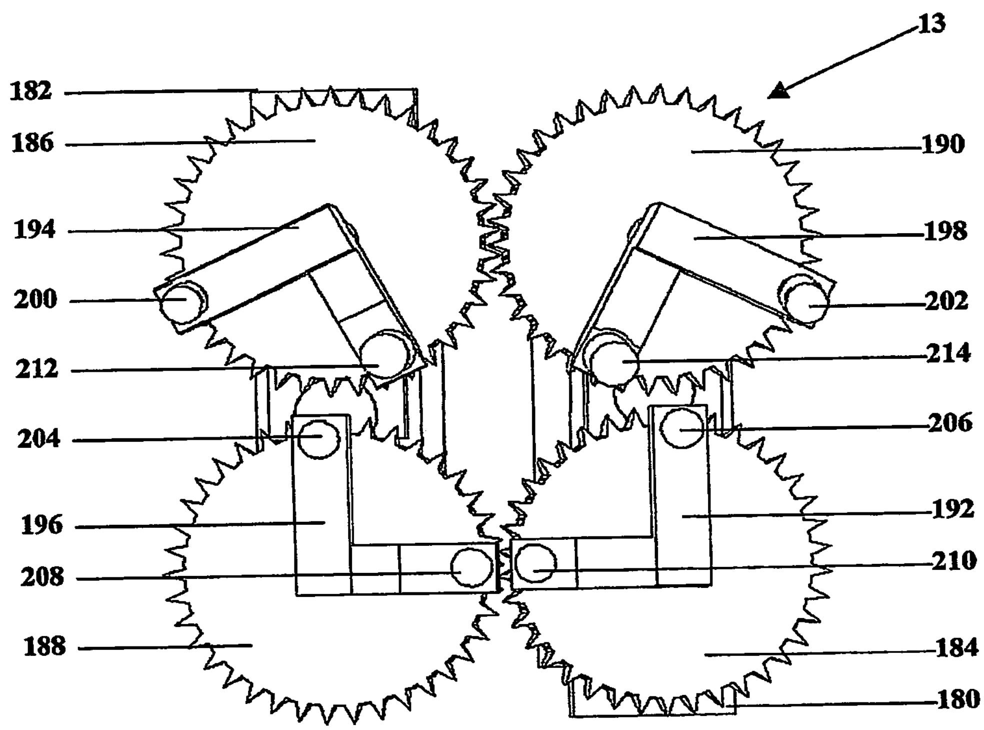

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FIG. 6d

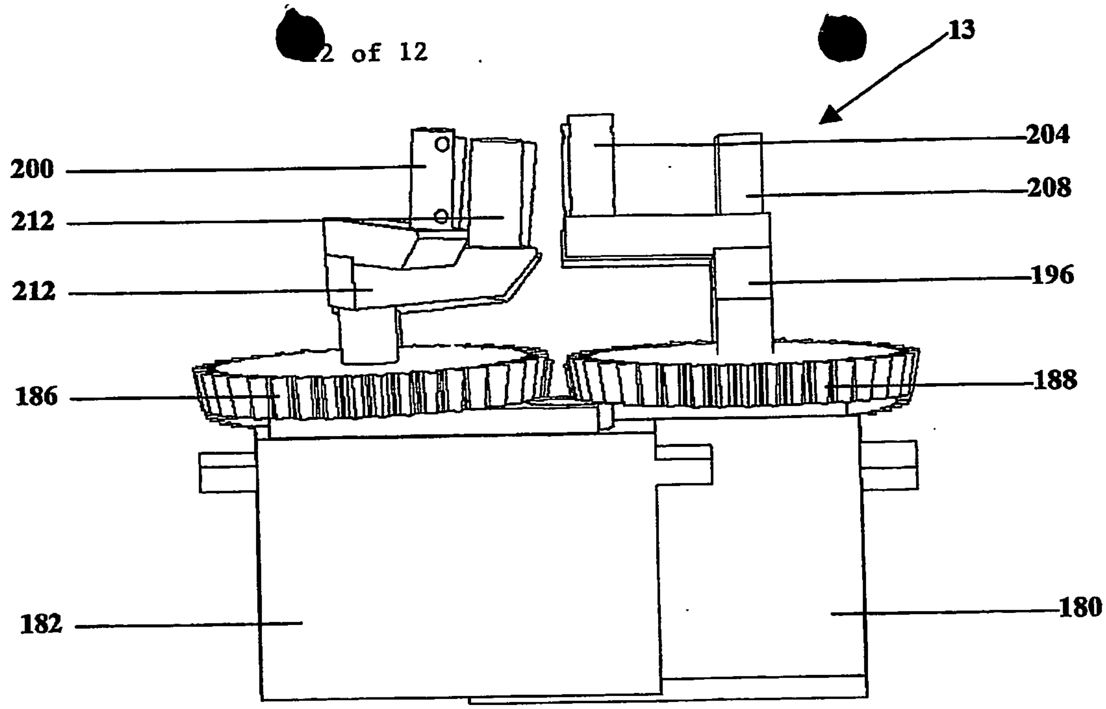

FIG. 6e

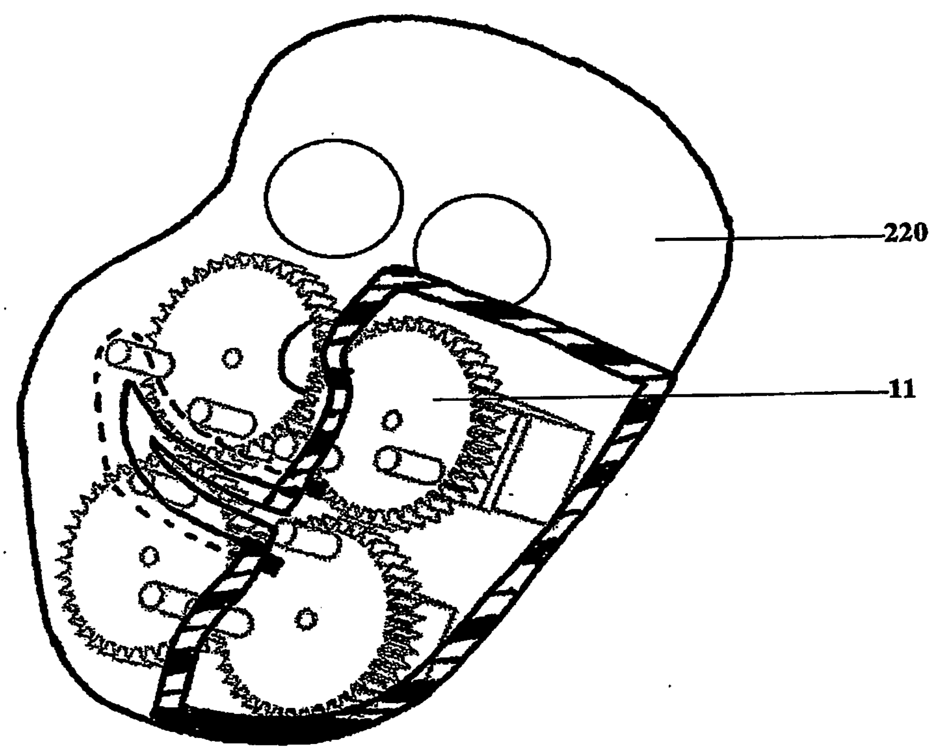

FIG. 7